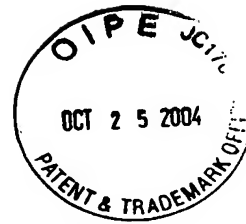


SEQUENCE LISTING



<110> JESTIN, JEAN-LUC
VICHIER-GUERRE, SOPHIE

<120> METHODS FOR OBTAINING THERMOSTABLE ENZYMES, DNA POLYMERASE I
VARIANTS FROM THERMUS AQUATICUS HAVING NEW CATALYTIC ACTIVITIES,
METHODS FOR OBTAINING THE SAME, AND APPLICATIONS OF THE SAME

<130> 248628USOX

<140> 10/787,219

<141> 2004-02-27

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<170> PatentIn version 3.3

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tgccgcgc 1688

<210> 22
<211> 562
<212> PRT
<213> *Thermus aquaticus*
<400> 22

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala
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Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
20 25 30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala
50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala
 225 230 235 240

Val Leu Gly Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu
290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala
305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Thr Leu Asp Tyr Ser Gln
325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile
340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp
355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala
370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg
385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile
405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys
420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly
435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg
450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala
465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu
485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu
500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu
515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val
530 535 540

Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu Val
545 550 555 560

Pro Arg

<210> 23
<211> 1688
<212> DNA
<213> Thermus aquaticus

<400> 23
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<210> 24

<211> 562

<212> PRT

<213> *Thermus aquaticus*

<400> 24

Met	Ala	Ser	Gly	Gly	Gly	Gly	Cys	Gly	Gly	Gly	Gly	Ser	Pro	Lys	Ala
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Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
 20 25 30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Gln Leu Asn
 195 200 205

Gln Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
 245 250 255

Gln Tyr Arg Glu Leu Asn Lys Leu Lys Ser Thr Gln Ile Thr Gln Leu
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
 275 280 285

Gln Thr Ala Thr Gln Thr Gly Arg Leu Ser Ser Ser Gln Pro Asn Leu
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Thr
 305 310 315 320

Phe Ile Ala Glu Glu Gly Arg Leu Leu Val Ala Leu Asp Tyr Asn Gln
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly
 435 440 445

Arg Arg Arg Tyr Leu Pro Asp Leu Glu Ala Gln Val Lys Asn Val Arg
 450 455 460

Glu Ala Ala Glu Arg Arg Ala Phe Asn Met Pro Val Gln Gly Thr Ala
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val
 530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val
 545 550 555 560

Pro Arg

<210> 25
 <211> 1688
 <212> DNA
 <213> Thermus aquaticus

<400> 25
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tggaggtgga ggtggggata ggggaggact ggctctccgc caaggaggcg gccgcactgg	1680
tgccgcgc	1688

<210> 26
 <211> 562
 <212> PRT
 <213> *Thermus aquaticus*

<400> 26

Met	Ala	Ser	Gly	Gly	Gly	Gly	Cys	Gly	Gly	Gly	Gly	Ser	Pro	Lys	Ala
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			20					25					30		

Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	Leu	Ala	Leu	Ala
		35					40					45			

Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu	Pro	Tyr	Lys	Ala
	50					55					60				

Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ser
65					70					75					80

Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	Gly	Asp	Asp	Pro
				85					90					95	

Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly
			100					105					110		

Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	Ala	Gly	Glu	Arg
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Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	Glu
	130					135					140				

Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	Glu	Arg	Pro	Leu
145					150					155					160

Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asp	Val
				165					170					175	

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
 275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg
 450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu
 500 505 510

Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala Arg Leu Ala Lys Glu
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val
 530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val
 545 550 555 560

Pro Arg

<210> 27

<211> 1688
 <212> DNA
 <213> *Thermus aquaticus*

<400> 27
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<210> 28
 <211> 562
 <212> PRT
 <213> *Thermus aquaticus*

<400> 28

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala
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Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
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Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu
130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu
145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val
165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn
195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Val
225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu
290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala
305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln
325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile
340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp
355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala
370 375 380

Ala Lys Ser Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg
385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile
405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys
420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly
435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg
450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala
465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Ser Pro Arg Leu Glu
485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu
500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu
515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val

530

535

540

Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu Val
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Pro Arg

<210> 29

<211> 1688

<212> DNA

<213> Thermus aquaticus

<400> 29

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tgccgcgc 1688

```

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<210> 30
<211> 562
<212> PRT
<213> Thermus aquaticus

```

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<400> 30
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```

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala
1           5           10           15

```

```

Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
          20           25           30

```

```

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
          35           40           45

```

```

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala
          50           55           60

```

```

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser
65           70           75           80

```

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
 275 280 285

Gln Thr Val Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg
 450 455 460

Glu Ala Ala Glu Arg Met Ala Tyr Asn Met Pro Val Gln Gly Thr Ala
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu

485

490

495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val
 530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val
 545 550 555 560

Pro Arg

<210> 31
 <211> 1688
 <212> DNA
 <213> Thermus aquaticus

<400> 31
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 tgtgggccga tcttctggcc ctggccgccc ccaggggggg ccgggtccac cgggcccccg 180
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ccgtcctgga ggccctccgc gagggcccacc ccatcggtga gaagatcctg cagtaccggg	780
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cgggcccgcct ccacacccgc ttcaaccaga cggccacggc cacggggcagg ctaagtagct	900
ccgatcccaa cctccagaac atccccgtcc gcaccccgtc tgggcagagg atccgccggg	960
ccttcacgcg cgaggagggg tggctattgg tggccctgga ctatagccag atagagctca	1020
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tggaggtgga ggtggggata ggggaggacc ggctctccgc caaggaggcg gccgcactgg	1680
tgccgcgc	1688

<210> 32
 <211> 562
 <212> PRT
 <213> *Thermus aquaticus*

<400> 32

Met	Ala	Ser	Gly	Gly	Gly	Gly	Cys	Gly	Gly	Gly	Gly	Ser	Pro	Lys	Ala
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Leu	Glu	Glu	Ala	Pro	Trp	Pro	Pro	Pro	Glu	Gly	Ala	Phe	Val	Gly	Phe
			20					25					30		

Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	Leu	Ala	Leu	Ala	35	40	45
Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu	Pro	Tyr	Lys	Ala	50	55	60
Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ser	65	70	75
Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	Gly	Asp	Asp	Pro	85	90	95
Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	100	105	110
Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	Ala	Gly	Glu	Arg	115	120	125
Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	Glu	130	135	140
Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	Glu	Arg	Pro	Leu	145	150	155
Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asp	Val	165	170	175
Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	Glu	Ile	Ala	Arg	180	185	190
Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	195	200	205
Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	Leu	Gly	Leu	Pro	210	215	220
Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	225	230	235
																240		

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu
290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala
305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln
325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile
340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp
355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala
370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg
385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile
405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys
420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly

435		440		445
Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg				
450		455		460
Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala				
465		470		480
Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu				
	485		490	495
Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu				
	500		505	510
Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu				
	515		520	525
Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val				
	530		535	540
Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu Val				
545		550		560

Pro Arg

<210> 33
 <211> 1688
 <212> DNA
 <213> Thermus aquaticus

<400> 33	
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tgtggggccga tcttctggcc ctggccgccg ccaggggggg ccgggtccac cgggcccccg	180
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cctacctcct	ggacccttcc	aacaccaccc	ccgagggggt	ggcccggcgc	tacggcgggg	360
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ccgatcccaa	cctccagaac	atccccgtcc	gcaccccgtc	tgggcagagg	atccgccggg	960
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tgccgcgc						1688

<210> 34
<211> 562

<212> PRT
<213> *Thermus aquaticus*

<400> 34

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala
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Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
20 25 30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala
50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser
65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro
85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly
100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg
115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu
130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu
145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val
165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn
195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala
225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu
290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala
305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln
325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile
340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp
355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala
370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg

385		390		395		400
Leu Ser Gln Glu	Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile	405		410		415
Glu Arg Tyr Phe	Leu Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys	420		425		430
Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly		435		440		445
Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg		450		455		460
Glu Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val Gln Gly Thr Ala		465		470		475
Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu		485		490		495
Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu		500		505		510
Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu		515		520		525
Val Met Glu Gly Val Tyr Pro Leu Ala Val Leu Leu Glu Val Glu Val		530		535		540
Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val		545		550		555
						560

Pro Arg

<210> 35
 <211> 1688
 <212> DNA
 <213> Thermus aquaticus

<400> 35

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ccttcatcgc	cgaggagggg	tggctattgg	tggccctgga	ctatagccag	atagagctca	1020
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cccggatgct ccttcaggtc cacgacgagc tggtcctcga ggccccaaaa gagggggcgg 1560
 aggccgtggc ccggctggcc aaggaggtca tggaggggggt gtatcccctg gccgtgcccc 1620
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 tgccgcgc 1688

<210> 36
 <211> 562
 <212> PRT
 <213> *Thermus aquaticus*

<400> 36

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala
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Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
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Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu
145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val
165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn
195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala
225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
260 265 270

Gln Asp Leu Ile His Pro Ser Thr Gly Arg Leu His Thr Arg Phe Asn
275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu
290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala
305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln
325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile

340					345					350					
Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu	Thr	Ala	Ser	Trp
		355					360					365			
Met	Phe	Gly	Val	Pro	Arg	Glu	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala
	370					375					380				
Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg
385					390					395					400
Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	Ile
				405					410					415	
Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys
			420					425					430		
Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly
		435					440					445			
Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	Lys	Ser	Glu	Arg
	450					455					460				
Glu	Ala	Ala	Glu	Arg	Met	Ala	Tyr	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala
465					470					475					480
Ala	Asp	Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Glu
				485					490					495	
Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	Glu	Leu	Val	Leu
			500					505					510		
Glu	Ala	Pro	Lys	Glu	Gly	Ala	Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu
		515					520					525			
Val	Met	Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	Glu	Ala	Glu	Val
	530					535					540				

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val
 545 550 555 560

Pro Arg

<210> 37
 <211> 1688
 <212> DNA
 <213> *Thermus aquaticus*

<400> 37
 ccatggcctc tgggtggcggg ggctgtggtg gcggtggcag cccaaggcc ctggaggagg 60
 ccccttgcc cccgccgga ggggccttcg tgggctttgt gctttccgc aaggagcca 120
 tgtgggccga tcttctggcc ctggccgccg ccaggggggg ccgggtccac cgggcccccg 180
 agccttataa agccctcagg gacctgaagg aggcgcgggg gcttctcgcc aaagacctga 240
 gcgttctggc cctgagggaa ggccttgcc tccgcccgg cgacgacccc atgctcctcg 300
 cctacctcct ggacccttc aacaccaccc ccgagggggg ggcccggcgc tacggcgggg 360
 agtggacgga ggaggcgggg gagcggggccg ccctttccga gaggtcttc gccaacctgt 420
 gggggagggt tgagggggag gagaggctcc tttggcttta ccgggagggt gagaggcccc 480
 tttccgctgt cctggcccac atggaggcca cgggggtgcg cctggacgtg gcctatctca 540
 gggccttgtc cctggagggt gccgaggaga tcgcccgcct cgaggccgag gtcttccgcc 600
 tggccggcca ccccttcaac ctcaactccc gggaccagct ggaaagggtc ctctttgacg 660
 agctaggggt tcccgccatc ggcaagacgg agaagaccgg caagcgctcc accagcgccg 720
 ccgtcctgga ggccctccgc gaggcccacc ccatcggtga gaagatcctg cagtaccggg 780
 agctcaccaa gctgaagagc acctacattg accccttgcc ggacctcatc cccccagga 840
 cgggccgcct ccacaccgc ttcaaccaga cggccacggc cacgggcagg ctaagtagct 900
 ccgatcccaa cctccagaac atccccgtcc gcaccccgt tgggcagagg atccgccggg 960
 ccttcacgc cgaggagggg tggctattgg tggccctgga ctatagccag atagagctca 1020
 gggtgctggc ccacctctcc ggcgacgaga acctgatccg ggtcttcag gaggggcggg 1080
 acatccacac ggagaccgcc agctggatgt tcggcgctcc ccgggaggcc gtggaccccc 1140

tgatgcgccg ggcggccaag accatcaact tcgggggtcct ctacggcatg tcggcccacc 1200
 gcctctccca ggagctagcc atcccttacg aggaggccca ggccttcatt gagcgctact 1260
 ttcagagctt cccaaggtg cgggcctgga ttgagaagac cctggaggag ggcaggaggc 1320
 gggggtacgt ggagaccctc ttcggccgcc gccgctacgt gccagaccta gaggcccggg 1380
 tgaagagcgt gcgggaggcg gccgagcgca tggccttcaa catgcccgtc cagggcaccg 1440
 ccgccgacct cgtgaagctg gctatggtga agctcttccc caggctggag gaaatggggg 1500
 ccaggatgct ccttcaggtc cacgacgagc tggtcctcga ggccccaaaa gagggggcgg 1560
 aggccgtggc ccggctggcc aaggaggtca tggagggggg gtatcccctg gccgtgcccc 1620
 tggaggtgga ggtggggata ggggaggact ggctctccgc caaggaggcg gccgcactgg 1680
 tgccgcgc 1688

<210> 38
 <211> 562
 <212> PRT
 <213> *Thermus aquaticus*

<400> 38

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala
 1 5 10 15

Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
 20 25 30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly
100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg
115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu
130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu
145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val
165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg
180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn
195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro
210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala
225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu
245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu
260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn
275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu

290	295	300
Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala 305 310 315 320		
Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln 325 330 335		
Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile 340 345 350		
Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp 355 360 365		
Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala 370 375 380		
Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg 385 390 395 400		
Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile 405 410 415		
Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys 420 425 430		
Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly 435 440 445		
Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg 450 455 460		
Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala 465 470 475 480		
Ala Asp Leu Val Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu 485 490 495		

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu
500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu
515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val
530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val
545 550 555 560

Pro Arg

<210> 39
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 39

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly
1 5 10

<210> 40
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 40

Ala Ala Ala Leu Val Pro Arg Gly Ser Leu Glu His His His His His
1 5 10 15

His

<210> 41
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 41

Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
1 5 10 15

Ala Gln Pro Ala Met Ala
20

<210> 42
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 42

Met Lys Thr Leu Leu Ala Met Val Leu Val Gly Leu Leu Leu Leu Pro
1 5 10 15

Pro Gly Pro Ser Met Ala
20

<210> 43
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 43

Met Arg Gly Leu Leu Ala Met Leu Val Ala Gly Leu Leu Leu Leu Pro
1 5 10 15

Ile Ala Pro Ala Met Ala
20

<210> 44
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 44

Met Arg Arg Leu Leu Val Ile Ala Ala Gly Leu Leu Leu Leu Leu Ala
1 5 10 15

Pro Pro Thr Met Ala
20

<210> 45
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic DNA

<400> 45
gcggccgcac tggtgccgcg cggcagcctc gag

33

<210> 46
<211> 148
<212> PRT
<213> Homo sapiens

<400> 46

Ala Asp Gln Leu Thr Glu Glu Gln Ile Ala Glu Phe Lys Glu Ala Phe
1 5 10 15

Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr Ile Thr Thr Lys Glu Leu
20 25 30

Gly Thr Val Met Arg Ser Leu Gly Gln Asn Pro Thr Glu Ala Glu Leu
35 40 45

Gln Asp Met Ile Asn Glu Val Asp Ala Asp Gly Asn Gly Thr Ile Asp
 50 55 60

Phe Pro Glu Phe Leu Thr Met Met Ala Arg Lys Met Lys Asp Thr Asp
 65 70 75 80

Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg Val Phe Asp Lys Asp Gly
 85 90 95

Asn Gly Tyr Ile Ser Ala Ala Glu Leu Arg His Val Met Thr Asn Leu
 100 105 110

Gly Glu Lys Leu Thr Asp Glu Glu Val Asp Glu Met Ile Arg Glu Ala
 115 120 125

Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr Glu Glu Phe Val Gln Met
 130 135 140

Met Thr Ala Lys
 145

<210> 47
 <211> 114
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic DNA

<400> 47

Gln Val Gln Leu Gln Gln Ser Gly Pro Glu Asp Val Lys Pro Gly Ala
 1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
 20 25 30

Tyr Met Asn Trp Val Lys Gln Ser Pro Gly Lys Gly Leu Glu Trp Ile
 35 40 45

Gly Asp Ile Asn Pro Asn Asn Gly Gly Thr Ser Tyr Asn Gln Lys Phe
 50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr
 65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ser Val Tyr Tyr Cys
 85 90 95

Glu Ser Gln Ser Gly Ala Tyr Trp Gly Gln Gly Thr Thr Val Thr Val
 100 105 110

Ser Ala

<210> 48
 <211> 20
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Peptide

<400> 48

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
 1 5 10 15

Gly Gly Gly Ser
 20

<210> 49
 <211> 116
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic Peptide

<400> 49

Asp Tyr Lys Asp Ile Leu Met Thr Gln Thr Pro Ser Ser Leu Pro Val
 1 5 10 15

Ser Leu Gly Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Ile
 20 25 30

Val His Ser Asn Gly Asn Thr Tyr Leu Glu Trp Tyr Leu Gln Lys Pro
 35 40 45

Gly Gln Ser Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe Ser
 50 55 60

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 65 70 75 80

Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr Cys
 85 90 95

Phe Gln Gly Ser His Val Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu
 100 105 110

Glu Ile Lys Arg
 115

<210> 50
 <211> 291
 <212> PRT
 <213> Thermus thermophilus

<400> 50

Met Glu Ala Met Leu Pro Leu Phe Glu Pro Lys Gly Arg Val Leu Leu
 1 5 10 15

Val Asp Gly His His Leu Ala Tyr Arg Thr Phe Phe Ala Leu Lys Gly
 20 25 30

Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val Tyr Gly Phe Ala
 35 40 45

Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Tyr Lys Ala Val Phe
 50 55 60

Val Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu Ala Tyr Glu
 65 70 75 80
 Ala Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe Pro Arg Gln
 85 90 95
 Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Phe Thr Arg Leu
 100 105 110
 Glu Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Thr Leu Ala Lys
 115 120 125
 Lys Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr Ala Asp Arg
 130 135 140
 Asp Leu Tyr Gln Leu Val Ser Asp Arg Val Ala Val Leu His Pro Glu
 145 150 155 160
 Gly His Leu Ile Thr Pro Glu Trp Leu Trp Glu Lys Tyr Gly Leu Arg
 165 170 175
 Pro Glu Gln Trp Val Asp Phe Arg Ala Leu Val Gly Asp Pro Ser Asp
 180 185 190
 Asn Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala Leu Lys Leu
 195 200 205
 Leu Lys Glu Trp Gly Ser Leu Glu Asn Leu Leu Lys Asn Leu Asp Arg
 210 215 220
 Val Lys Pro Glu Asn Val Arg Glu Lys Ile Lys Ala His Leu Glu Asp
 225 230 235 240
 Leu Arg Leu Ser Leu Glu Leu Ser Arg Val Arg Thr Asp Leu Pro Leu
 245 250 255
 Glu Val Asp Leu Ala Gln Gly Arg Glu Pro Asp Arg Glu Gly Leu Arg

260

265

270

Ala Phe Leu Glu Arg Leu Glu Phe Gly Ser Leu Leu His Glu Phe Gly
 275 280 285

Leu Leu Glu
 290

<210> 51
 <211> 196
 <212> PRT
 <213> Escherichia coli
 <400> 51

Val Ile Ser Tyr Asp Asn Tyr Val Thr Ile Leu Asp Glu Glu Thr Leu
 1 5 10 15

Lys Ala Trp Ile Ala Lys Leu Glu Lys Ala Pro Val Phe Ala Phe Asp
 20 25 30

Thr Glu Thr Asp Ser Leu Asp Asn Ile Ser Ala Asn Leu Val Gly Leu
 35 40 45

Ser Phe Ala Ile Glu Pro Gly Val Ala Ala Tyr Ile Pro Val Ala His
 50 55 60

Asp Tyr Leu Asp Ala Pro Asp Gln Ile Ser Arg Glu Arg Ala Leu Glu
 65 70 75 80

Leu Leu Lys Pro Leu Leu Glu Asp Glu Lys Ala Leu Lys Val Gly Gln
 85 90 95

Asn Leu Lys Tyr Asp Arg Gly Ile Leu Ala Asn Tyr Gly Ile Glu Leu
 100 105 110

Arg Gly Ile Ala Phe Asp Thr Met Leu Glu Ser Tyr Ile Leu Asn Ser
 115 120 125

Val Ala Gly Arg His Asp Met Asp Ser Leu Ala Glu Arg Trp Leu Lys

130

135

140

His Lys Thr Ile Thr Phe Glu Glu Ile Ala Gly Lys Gly Lys Asn Gln
 145 150 155 160

Leu Thr Phe Asn Gln Ile Ala Leu Glu Glu Ala Gly Arg Tyr Ala Ala
 165 170 175

Glu Asp Ala Asp Val Thr Leu Gln Leu His Leu Lys Met Trp Pro Asp
 180 185 190

Leu Gln Lys His
 195

<210> 52
 <211> 686
 <212> PRT
 <213> Bacillus circulans

<400> 52

Ala Pro Asp Thr Ser Val Ser Asn Lys Gln Asn Phe Ser Thr Asp Val
 1 5 10 15

Ile Tyr Gln Ile Phe Thr Asp Arg Phe Ser Asp Gly Asn Pro Ala Asn
 20 25 30

Asn Pro Thr Gly Ala Ala Phe Asp Gly Thr Cys Thr Asn Leu Arg Leu
 35 40 45

Tyr Cys Gly Gly Asp Trp Gln Gly Ile Ile Asn Lys Ile Asn Asp Gly
 50 55 60

Tyr Leu Thr Gly Met Gly Val Thr Ala Ile Trp Ile Ser Gln Pro Val
 65 70 75 80

Glu Asn Ile Tyr Ser Ile Ile Asn Tyr Ser Gly Val Asn Asn Thr Ala
 85 90 95

Tyr His Gly Tyr Trp Ala Arg Asp Phe Lys Lys Thr Asn Pro Ala Tyr

100					105					110					
Gly	Thr	Ile	Ala	Asp	Phe	Gln	Asn	Leu	Ile	Ala	Ala	Ala	His	Ala	Lys
		115					120					125			
Asn	Ile	Lys	Val	Ile	Ile	Asp	Phe	Ala	Pro	Asn	His	Thr	Ser	Pro	Ala
	130					135					140				
Ser	Ser	Asp	Gln	Pro	Ser	Phe	Ala	Glu	Asn	Gly	Arg	Leu	Tyr	Asp	Asn
145					150					155					160
Gly	Thr	Leu	Leu	Gly	Gly	Tyr	Thr	Asn	Asp	Thr	Gln	Asn	Leu	Phe	His
				165					170					175	
His	Asn	Gly	Gly	Thr	Asp	Phe	Ser	Thr	Thr	Glu	Asn	Gly	Ile	Tyr	Lys
			180					185					190		
Asn	Leu	Tyr	Asp	Leu	Ala	Asp	Leu	Asn	His	Asn	Asn	Ser	Thr	Val	Asp
		195					200					205			
Val	Tyr	Leu	Lys	Asp	Ala	Ile	Lys	Met	Trp	Leu	Asp	Leu	Gly	Ile	Asp
	210					215					220				
Gly	Ile	Arg	Met	Asp	Ala	Val	Lys	His	Met	Pro	Phe	Gly	Trp	Gln	Lys
225					230					235					240
Ser	Phe	Met	Ala	Ala	Val	Asn	Asn	Tyr	Lys	Pro	Val	Phe	Thr	Phe	Gly
			245						250					255	
Glu	Trp	Phe	Leu	Gly	Val	Asn	Glu	Val	Ser	Pro	Glu	Asn	His	Lys	Phe
			260					265					270		
Ala	Asn	Glu	Ser	Gly	Met	Ser	Leu	Leu	Asp	Phe	Arg	Phe	Ala	Gln	Lys
		275					280					285			
Val	Arg	Gln	Val	Phe	Arg	Asp	Asn	Thr	Asp	Asn	Met	Tyr	Gly	Leu	Lys
	290					295					300				

Ala Met Leu Glu Gly Ser Ala Ala Asp Tyr Ala Gln Val Asp Asp Gln
 305 310 315 320

Val Thr Phe Ile Asp Asn His Asp Met Glu Arg Phe His Ala Ser Asn
 325 330 335

Ala Asn Arg Arg Lys Leu Glu Gln Ala Leu Ala Phe Thr Leu Thr Ser
 340 345 350

Arg Gly Val Pro Ala Ile Tyr Tyr Gly Thr Glu Gln Tyr Met Ser Gly
 355 360 365

Gly Thr Asp Pro Asp Asn Arg Ala Arg Ile Pro Ser Phe Ser Thr Ser
 370 375 380

Thr Thr Ala Tyr Gln Val Ile Gln Lys Leu Ala Pro Leu Arg Lys Cys
 385 390 395 400

Asn Pro Ala Ile Ala Tyr Gly Ser Thr Gln Glu Arg Trp Ile Asn Asn
 405 410 415

Asp Val Leu Ile Tyr Glu Arg Lys Phe Gly Ser Asn Val Ala Val Val
 420 425 430

Ala Val Asn Arg Asn Leu Asn Ala Pro Ala Ser Ile Ser Gly Leu Val
 435 440 445

Thr Ser Leu Pro Gln Gly Ser Tyr Asn Asp Val Leu Gly Gly Leu Leu
 450 455 460

Asn Gly Asn Thr Leu Ser Val Gly Ser Gly Gly Ala Ala Ser Asn Phe
 465 470 475 480

Thr Leu Ala Ala Gly Gly Thr Ala Val Trp Gln Tyr Thr Ala Ala Thr
 485 490 495

Ala Thr Pro Thr Ile Gly His Val Gly Pro Met Met Ala Lys Pro Gly
 500 505 510

Val Thr Ile Thr Ile Asp Gly Arg Gly Phe Gly Ser Ser Lys Gly Thr
515 520 525

Val Tyr Phe Gly Thr Thr Ala Val Ser Gly Ala Asp Ile Thr Ser Trp
530 535 540

Glu Asp Thr Gln Ile Lys Val Lys Ile Pro Ala Val Ala Gly Gly Asn
545 550 555 560

Tyr Asn Ile Lys Val Ala Asn Ala Ala Gly Thr Ala Ser Asn Val Tyr
565 570 575

Asp Asn Phe Glu Val Leu Ser Gly Asp Gln Val Ser Val Arg Phe Val
580 585 590

Val Asn Asn Ala Thr Thr Ala Leu Gly Gln Asn Val Tyr Leu Thr Gly
595 600 605

Ser Val Ser Glu Leu Gly Asn Trp Asp Pro Ala Lys Ala Ile Gly Pro
610 615 620

Met Tyr Asn Gln Val Val Tyr Gln Tyr Pro Asn Trp Tyr Tyr Asp Val
625 630 635 640

Ser Val Pro Ala Gly Lys Thr Ile Glu Phe Lys Phe Leu Lys Lys Gln
645 650 655

Gly Ser Thr Val Thr Trp Glu Gly Gly Ser Asn His Thr Phe Thr Ala
660 665 670

Pro Ser Ser Gly Thr Ala Thr Ile Asn Val Asn Trp Gln Pro
675 680 685

<210> 53
<211> 399
<212> PRT
<213> Bordetella pertussis

<400> 53

Met	Gln	Gln	Ser	His	Gln	Ala	Gly	Tyr	Ala	Asn	Ala	Ala	Asp	Arg	Glu	1	5	10	15
Ser	Gly	Ile	Pro	Ala	Ala	Val	Leu	Asp	Gly	Ile	Lys	Ala	Val	Ala	Lys	20	25	30	
Glu	Lys	Asn	Ala	Thr	Leu	Met	Phe	Arg	Leu	Val	Asn	Pro	His	Ser	Thr	35	40	45	
Ser	Leu	Ile	Ala	Glu	Gly	Val	Ala	Thr	Lys	Gly	Leu	Gly	Val	His	Ala	50	55	60	
Lys	Ser	Ser	Asp	Trp	Gly	Leu	Gln	Ala	Gly	Tyr	Ile	Pro	Val	Asn	Pro	65	70	75	80
Asn	Leu	Ser	Lys	Leu	Phe	Gly	Arg	Ala	Pro	Glu	Val	Ile	Ala	Arg	Ala	85	90	95	
Asp	Asn	Asp	Val	Asn	Ser	Ser	Leu	Ala	His	Gly	His	Thr	Ala	Val	Asp	100	105	110	
Leu	Thr	Leu	Ser	Lys	Glu	Arg	Leu	Asp	Tyr	Leu	Arg	Gln	Ala	Gly	Leu	115	120	125	
Val	Thr	Gly	Met	Ala	Asp	Gly	Val	Val	Ala	Ser	Asn	His	Ala	Gly	Tyr	130	135	140	
Glu	Gln	Phe	Glu	Phe	Arg	Val	Lys	Glu	Thr	Ser	Asp	Gly	Arg	Tyr	Ala	145	150	155	160
Val	Gln	Tyr	Arg	Arg	Lys	Gly	Gly	Asp	Asp	Phe	Glu	Ala	Val	Lys	Val	165	170	175	
Ile	Gly	Asn	Ala	Ala	Gly	Ile	Pro	Leu	Thr	Ala	Asp	Ile	Asp	Met	Phe	180	185	190	
Ala	Ile	Met	Pro	His	Leu	Ser	Asn	Phe	Arg	Asp	Ser	Ala	Arg	Ser	Ser	195	200	205	

Val Thr Ser Gly Asp Ser Val Thr Asp Tyr Leu Ala Arg Thr Arg Arg
210 215 220
Ala Ala Ser Glu Ala Thr Gly Gly Leu Asp Arg Glu Arg Ile Asp Leu
225 230 235 240
Leu Trp Lys Ile Ala Arg Ala Gly Ala Arg Ser Ala Val Gly Thr Glu
245 250 255
Ala Arg Arg Gln Phe Arg Tyr Asp Gly Asp Met Asn Ile Gly Val Ile
260 265 270
Thr Asp Phe Glu Leu Glu Val Arg Asn Ala Leu Asn Arg Arg Ala His
275 280 285
Ala Val Gly Ala Gln Asp Val Val Gln His Gly Thr Glu Gln Asn Asn
290 295 300
Pro Phe Pro Glu Ala Asp Glu Lys Ile Phe Val Val Ser Ala Thr Gly
305 310 315 320
Glu Ser Gln Met Leu Thr Arg Gly Gln Leu Lys Glu Tyr Ile Gly Gln
325 330 335
Gln Arg Gly Glu Gly Tyr Val Phe Tyr Glu Asn Arg Ala Tyr Gly Val
340 345 350
Ala Gly Lys Ser Leu Phe Asp Asp Gly Leu Gly Ala Ala Pro Gly Val
355 360 365
Pro Ser Gly Arg Ser Lys Phe Ser Pro Asp Val Leu Glu Thr Val Pro
370 375 380
Ala Ser Pro Gly Leu Arg Arg Pro Ser Leu Gly Ala Val Glu Arg
385 390 395

<210> 54

<211> 275
 <212> PRT
 <213> Bacillus amyloliquefaciens

<400> 54

Ala Gln Ser Val Pro Tyr Gly Val Ser Gln Ile Lys Ala Pro Ala Leu
 1 5 10 15

His Ser Gln Gly Tyr Thr Gly Ser Asn Val Lys Val Ala Val Ile Asp
 20 25 30

Ser Gly Ile Asp Ser Ser His Pro Asp Leu Lys Val Ala Gly Gly Ala
 35 40 45

Ser Met Val Pro Ser Glu Thr Asn Pro Phe Gln Asp Asn Asn Ser His
 50 55 60

Gly Thr His Val Ala Gly Thr Val Ala Ala Leu Asn Asn Ser Ile Gly
 65 70 75 80

Val Leu Gly Val Ala Pro Ser Ala Ser Leu Tyr Ala Val Lys Val Leu
 85 90 95

Gly Ala Asp Gly Ser Gly Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu
 100 105 110

Trp Ala Ile Ala Asn Asn Met Asp Val Ile Asn Met Ser Leu Gly Gly
 115 120 125

Pro Ser Gly Ser Ala Ala Leu Lys Ala Ala Val Asp Lys Ala Val Ala
 130 135 140

Ser Gly Val Val Val Val Ala Ala Ala Gly Asn Glu Gly Thr Ser Gly
 145 150 155 160

Ser Ser Ser Thr Val Gly Tyr Pro Gly Lys Tyr Pro Ser Val Ile Ala
 165 170 175

Val Gly Ala Val Asp Ser Ser Asn Gln Arg Ala Ser Phe Ser Ser Val

180

185

190

Gly Pro Glu Leu Asp Val Met Ala Pro Gly Val Ser Ile Gln Ser Thr
 195 200 205

Leu Pro Gly Asn Lys Tyr Gly Ala Tyr Asn Gly Thr Ser Met Ala Ser
 210 215 220

Pro His Val Ala Gly Ala Ala Ala Leu Ile Leu Ser Lys His Pro Asn
 225 230 235 240

Trp Thr Asn Thr Gln Val Arg Ser Ser Leu Glu Asn Thr Thr Thr Lys
 245 250 255

Leu Gly Asp Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala
 260 265 270

Ala Ala Gln
 275

<210> 55
 <211> 182
 <212> PRT
 <213> Bacillus subtilis

<400> 55

Ala Ala Glu His Asn Pro Val Val Met Val His Gly Ile Gly Gly Ala
 1 5 10 15

Ser Phe Asn Phe Ala Gly Ile Lys Ser Tyr Leu Val Ser Gln Gly Trp
 20 25 30

Ser Arg Asp Lys Leu Tyr Ala Val Asp Phe Trp Asp Lys Thr Gly Thr
 35 40 45

Asn Tyr Asn Asn Gly Pro Val Leu Ser Arg Phe Val Gln Lys Val Leu
 50 55 60

Asp Glu Thr Gly Ala Lys Lys Val Asp Ile Val Ala His Ser Met Gly

65		70		75		80									
Gly	Ala	Asn	Thr	Leu	Tyr	Tyr	Ile	Lys	Asn	Leu	Asp	Gly	Gly	Asn	Lys
				85					90					95	
Val	Ala	Asn	Val	Val	Thr	Leu	Gly	Gly	Ala	Asn	Arg	Leu	Thr	Thr	Gly
			100					105					110		
Lys	Ala	Leu	Pro	Gly	Thr	Asp	Pro	Asn	Gln	Lys	Ile	Leu	Tyr	Thr	Ser
		115					120					125			
Ile	Tyr	Ser	Ser	Ala	Asp	Met	Ile	Val	Met	Asn	Tyr	Leu	Ser	Arg	Leu
	130					135					140				
Asp	Gly	Ala	Arg	Asn	Val	Gln	Ile	His	Gly	Val	Gly	His	Ile	Gly	Leu
145					150					155					160
Leu	Tyr	Ser	Ser	Gln	Val	Asn	Ser	Leu	Ile	Lys	Glu	Gly	Leu	Asn	Gly
				165					170					175	
Gly	Gly	Gln	Asn	Thr	Asn										
			180												

<210> 56
 <211> 444
 <212> DNA
 <213> Homo sapiens

<400> 56	
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cagaatccca cagaagcaga gttacaggac atgattaatg aagtagatgc tgatggtaat	180
ggcacaattg acttccctga atttctgaca atgatggcaa gaaaaatgaa agacacagac	240
agtgaagaag aaattagaga agcattccgt gtgtttgata aggatggcaa tggctatatt	300
agtgctgcag aacttcgcca tgtgatgaca aaccttggag agaagttaac agatgaagaa	360
gttgatgaaa tgatcaggga agcagatatt gatggtgatg gtcaagtaaa ctatgaagag	420

tttgtacaaa tgatgacagc aaag

444

<210> 57

<211> 2058

<212> DNA

<213> *Bacillus circulans*

<400> 57

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ggaacctgca cgaacctccg gctgtattgc ggcgggcgact ggcagggcat catcaacaaa	180
atcaacgacg gttacctgac cgggatgggc gttaccgcca tctggatctc ccagccggtc	240
gaaaacatct acagcatcat caattattcc ggcgtaaaca acacggccta tcacggctac	300
tgggcccggg acttcaagaa gacgaatccg gcctacggca cgattgcgga cttccagaac	360
ctgatcgccg ccgcgcatgc aaaaaacatc aaagtcatta tcgactttgc cccgaaccat	420
acgtcgcccg cctcgtccga ccagccttcc ttgcggaac acggccgggt gtacgataac	480
ggcacgctgc tcgggggata cacgaacgat acgcagaacc tgttccacca taacggcggc	540
acggactttt ccacgaccga aaacggcatc tacaaaaacc tgtacgatct cgccgacctg	600
aaccataaca acagcaccgt ggacgtctac ttgaaggacg cgatcaaaat gtggctggac	660
ctcggcatcg acggcatccg catggatgcg gtgaagcata tgccgttcgg ctggcagaag	720
agctttatgg ctgccgtcaa caactataag ccggtcttta ccttcggcga atggttcctg	780
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<210> 58
 <211> 1197
 <212> DNA
 <213> Bordetella pertussis

<400> 58	
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aacagcagcc tggcgcgatg ccataccgcg gtcgacctga cgctgtcgaa agagcggctt	360
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<210> 59

<211> 825

<212> DNA

<213> *Bacillus amyloliquefaciens*

<400> 59

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gatttaaagg tagcaggcgg agccagcatg gttccttctg aaacaaatcc tttccaagac	180
aacaactctc acggaactca cgttgccggc acagttgcgg ctcttaataa ctcaatcggt	240
gtattaggcg ttgcgccaag cgcatacactt tacgctgtaa aagttctcgg tgctgacggt	300
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<210> 60
 <211> 873
 <212> DNA
 <213> *Thermus thermophilus*

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aacctggacc	gggtaaagcc agaaaacgtc cgggagaaga tcaaggccca cctggaagac 720
ctcaggctct	ccttggagct ctcccgggtg cgcaccgacc tccccctgga ggtggacctc 780
gccagggggc	gggagcccga ccgggagggg cttagggcct tcctggagag gctggagttc 840
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<210> 61
 <211> 588
 <212> DNA
 <213> *Escherichia coli*

<400> 61

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gatcgcggtg ttctggcgaa ctacggcatt gaactgcgtg ggattgcgtt tgataccatg	360
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cgttgggttg agcacaaaac catcactttt gaagagattg ctggtaaagg caaaaatcaa	480
ctgaccttta accagattgc cctcgaagaa gccggacgtt acgccgccga agatgcagat	540
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